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Barbie goes X Games

A waterfall. A bucket of rubber bands. A thousand G.I. Joes chasing Barbie. How does she escape this? She doesn’t. She actually gets captured, shreds to pieces, and is eaten by a dog. However, if she did want to bungee down to a remote helicopter and travel to Lego Land and marry Ken, she would need my lab report to assist her escape. The purpose of this investigation is so we understand how linear equation cans be used to solve real-world problems.

The first part of this investigation is the procedure. To determine the number of rubber bands needed for the 4.82 meter jump, tests needed to be done. To test we start with having Barbie bungee down a chair using just one rubber band. After this first test we did this with 1 rubber band 2 more times and made an average of the 3 outcomes. We continued to do this same procedure for 2 rubber bands, 3 and so on. We stopped this procedure once we finished 6 rubber bands.

This chart represents the data we collected

Trials and mean is in inches

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of Rubber Bands | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | |
| Trials | 16 | 15 | 17 | 29 | 22 | 28 | 36 | 37 | 40 | 45 | 56 | 57 | 63 | 70 | 74 | 80 | 85 | 80 |
| Mean | 16 | | | 26.33 | | | 37.66 | | | 52.66 | | | 69 | | | 81.66 | | |

The data collected was all pretty even. The only outlier we had was 63 for 5 rubber bands.

After doing all of this my equation needed to be determined. I first entered the data into a calculator and made a scatter plot. The equation I needed to find was the point slope form since I needed to determine the slope. I then needed to find 2 data points that would sum up this data. I decided that the ones that look the best were (1,16) and (5,69). To determine the slope I need to do the equation (Y1-Y2)/(X1-X2). The Variable X for this equation was the number of rubber bands and Y was the distance traveled. The reason I used point slope form over intercept was because point slope shows the slope more clearly.

After this procedure next was the stairwell jump. TO have Barbie jump down the edge of the stairwell safely (not hit the floor) I needed to use the data to determine how any rubber bands. The height that needs to be traveled was 4.82 meters. I used my equation to determine that the correct number of rubber bands to use was 14. The distance Barbie traveled was 4.58 meters.

Two successes of my group were that we correctly made an equation for the data. Another was that we didn’t have Barbie hit the floor.

One problem we had was that we measured our trials in inches and the final jump was in meters so we had to convert our data into centimeters.

One improvement could be that we do 5 tests rather than 3 because it would make our slop more accurate.

Slope

The two points I used were (1,16) and (5,69) After doing the equation (Y1-Y2) / (X1-X2) or with my data (16-69) / (1-5) I got 13.25 as my slope.

Equation

Y=16+13.25(X-1)

Calculation:

To find the number of rubber bands needed I had to use a calculation. The calculation I used was{1,13.25}ENTER ANS(1)+1,ANS(2)+13.25. I did this until the second number in the calculation was the closest to 192 as possible. The reason it was this number and not 4.83 was that since we did our calculations in inches we had to modify 4.82 meters into inches. To do we had to multiply the number of inches in a meter (39inches) and multiplied it by 4.82 and got 192 as the product.